AMERICAN VETERINARY REVIEW,

JUNE, 1887.

EDITORIAL.

LEGISLATION RELATING TO VETERINARY MEDICINE.—Although ignored years ago, veterinary interests are now receiving a large share of attention—Pennsylvania asked to appropriate $100,000 for the veterinary department of the university of that State and gives $50,000—a law to regulate the practice of veterinary medicine asked for in Pennsylvania and New Jersey—the latter State fails to get it because she refuses to recognize quackery—New York gets one useless law, while a good one is refused—any one in that State can register—the good law is killed by a grinding diploma fee—a good lobby investment—lack of respect for the profession, and want of honor in word keeping—the American Veterinary College gets the benefit of one more special act. CERTIFICATES OF SOUNDNESS.—Inquiry by a purchaser—the examination for soundness is one of the most responsible and important incidents of veterinary practice—is a trust demanding the most careful attention by the practitioner—the fee is not in proportion to the value of the work if it is properly done—buyers ought always to employ responsible parties and trust to their ability and mode of examination, which should be done with scrupulous care, especially when done under conditions varying from the common, and wilful or ignorant misrepresentation deserves severe punishment by the courts. CORRECTION.—The membership of the Missouri State Veterinary Society is confined exclusively to regular members of the profession—letter of Dr. Paquin to that effect. NOTICE.—The May number of the REVIEW has failed to reach many of our readers—suggestion for future issues. EXPERIMENT STATION OF NEBRASKA UNIVERSITY.—Reappointment of Dr. Billings—the university will not, for the present, establish a veterinary department—Dr. B. does good work, and deserves well for his labors in behalf of the profession.

LEGISLATION RELATING TO VETERINARY MEDICINE—Twenty-five years ago who would have dreamed that veterinary science would ever acquire such an amount of importance in the estimation of the public as to become the subject of legislation in a number of the States of the Union, that these law-makers should

be asked to consider the merits of various enactments relating to that branch of medicine, declarative of its rights and protective of its interests? Yet to-day we have the record that not in one State alone but in many of them this is among the matters importunately urged for legislative action and popular attention.

In Pennsylvania, notably, a proposition has been introduced for an appropriation of $100,000 in behalf of the Veterinary Department of the University of that State in Philadelphia, the expenditure having for its object the completion of the buildings and other equipments of that department. We had always thought that the University of Pennsylvania possessed sufficient wealth to sustain the work of its special department without recourse to the State Association. We had also supposed that the generous private donations she has already received, and which have already accomplished much good, would have removed the necessity of further subsidies in the prosecution of the work which has been inaugurated. The members of the faculty having thus far furnished their services gratuitously, is it now to be inferred that a share of these $100,000 is calculated upon to aid in securing a continuance of their labors? We know of other institutions in the country where the members of the faculty have been for years, and up to a recent date, doing the same work just as generously. We sincerely hope, however needed, that the dollars will be brought to the rescue of the veterinary department in question, which is, no doubt, destined to become one of the first of the country in importance and usefulness. As we go to press, we receive the information that our hopes have been partly realized, and that the Legislature has granted $50,000, instead of the $100,000 asked for. A pretty nice help, however, and Pennsylvania can be proud of the wisdom of her legislators. Other bills involving veterinary interests have been introduced in the Pennsylvania Legislature as well as in that of New Jersey, but in neither State have their friends succeeded in having them passed into laws. The failure of the attempt in New Jersey, as we are informed, is to be attributed to the refusal of the veterinarians who were urging it, to submit to concessions which would legalize the practice of unqualified men. A good credit-mark should

be awarded to our Jersey confreres for this. But the most interesting spectacle of all has been the course of things in the Legislature of New York. If we have not been misinformed, the Solons of the Excelsior State have had no less than seven bills simultaneously offered for their consideration, of which, however, two only are of any interest to the profession of the State. One of these was passed and received the signature of the Governor; the other was killed. The first authorizes the extension of the rules of registration. It was a law which, however, was after all of but little account, when we take into consideration the wording of the act of last year, and the fact that now every man who wishes to do so may register. Yes, Dr. Middleton, we can answer your inquiry. We believe that any of your neighboring blacksmiths who so elect may go on filing horses' teeth, and may collect his two dollars without any fear of the penalty of the law. And if you ask us who is responsible for a state of things so absurdly disgraceful, we answer: Those who killed the second bill; those who, after petitioning the Legislature for the reinsertion of the clause eliminated from last year's law, prevented the transmission of the memorial to Albany, and thus caused the movement to abort; those, both regular and irregular, who are running a mill for grinding out diplomas and certificates, and own a veterinarian factory which returns them fat fees without work; those who, recreant to their word and to all considerations of professional honor, are perpetuating a system of disgraceful jobbing which will retard the progress of the profession in the State, and keep it half a century behind the age.

How long must this evil continue? is a pertinent query for the veterinarians of New York to answer. It is for them to say whether, as members of the profession, for which they have so laboriously toiled, they will allow themselves to be thrust aside, or walked over and ignored, in order that diploma-mills and certificate-machines may grind on and flourish undisturbed in their midst.

The legislators at Albany, it may further be said of them, though they have not only passed a useless law, and have refused to pass a valuable one, have still, once again, proved their appre-

ciation of the work done by the American Veterinary College by authorizing the acquisition of property to the amount of $150,000 by that school. Perhaps it ought to be considered that it is doing pretty well to obtain in two years two *special legislative acts* for an institution which, it is said *by some of its friends* (*?*) has no right to grant diplomas.

CORRECTION.—An error seems to have occurred in one of our recent issues, in our remarks touching the amendment to the Constitution of the United States Veterinary Medical Association, offered by Professor Michener, in which we stated that the Massachusetts Veterinary Medical Association was the only one in the country which restricted its membership to regular graduates. Dr. Paquin writes a letter requesting a correction of this statement, from which we learn that the Missouri Veterinary Medical Association has always respected this wholesome rule, and is wholly made up of genuine graduates. His letter will be found on another page.

NOTICE.—We have received this month a very large number of communications complaining of the non-receipt of our May number by our subscribers. We are at a loss for an explanation of this default, as the May REVIEW has been regularly mailed to every one who had notified us to renew his subscription. And in relation to this matter, we will say that the REVIEW is *always* mailed between the second and the fifth of each month. If not received in due season after the period designated, inquiry ought to be made at once at our office, or of the mail authorities.

CERTIFICATES OF SOUNDNESS.

To the Editor of the Herald:

A man buys a horse on the faith of a veterinary surgeon's certificate that the horse is sound. The buyer soon discovers that the horse is not sound and was not at the time of purchase, and that he (the buyer) is the victim of either ignorance or wilful misrepresentation on the part of the veterinary whom he has employed. Does the law afford any recourse against a veterinary under these circumstances? IGNORANT.

The above inquiry was addressed to the *Herald* a short time ago and received a proper answer from the editors of that valuable paper. Of all the specialties which belong to the practice of the veterinarian there are probably none which is more important to

the public, or which so thoroughly tests the resources of the practitioner as his implication in a horse-trade. The satisfactory examination of an animal for soundness at the time of purchase involves a question of trust which every veterinarian must fully appreciate, and in which he is bound to exercise the most scrupulous care, and every respectable practitioner will do his utmost to insure justice to the parties trusting his judgment. The duty, however, is sometimes a very difficult one, and in many instances involves special conditions, which renders the giving of an opinion a very onerous and perplexing task, and no amount of caution, and no degree of circumspection and discrimination will be wasted in the study, by the veterinarian, of all the elements of the case before him. The fee which is received for the work done and the responsibility attached to it, is not, however, usually proportionate to the expectations entertained by the buyer. Again, there are in many cases so many difficulties involved in the solution of the general question as to what really constitutes soundness, that there is really always more or less room for the intrusion of legal quibbles and quiddities. A horse-trade is notoriously and proverbially, amongst all the transactions in which men are accustomed to engage, that which most severely tries the conscientious aptitude of a man in connection with the average of men's general intelligence.

We do not wish to speak in extenuation of anything like a manifest evidence of ignorance or of dishonesty. We know too well that there are daily examples of such occurrences. What we especially desire to say in the matter is, to advise buyers to confide their interests to none but qualified and reputable practitioners, and to trust to *their* ability and their methods of examination, independently of any suggestion or objection that may be made by the interested dealer, whoever he may be. Let the veterinarian perform his duty in the very strictest sense of the word; let him examine the animal in every possible condition, placing him in such circumstances as shall not only exhibit his alleged present soundness, but shall betray his unsound condition, if it exists; let him test the animal, as nearly as he can, as the examining physician of a life insurance company tests a candidate for a life

policy, and let him, without hesitation or fear, put down in black and white, in the shape of a certificate, a proper statement of his conclusions, and he need not then fear prosecution for ignorance or wilful misrepresentation, which, if they existed, would most deservedly bring upon him a severe retributive visitation in the courts, such as we are sure he would indeed mercilessly receive at the hands of his brother practitioners in case they were made his judges.

EXPERIMENT STATION OF THE UNIVERSITY OF NEBRASKA.—As is well known to the majority of the readers of the REVIEW, our colleague, Dr. Billings, was called to take charge of this work in April, 1886, the call being of a temporary character. At the business meeting of the Regents of the University, April 1, 1887, Dr. Billings' appointment was made permanent at the usual salary paid professors; but, what is of more interest, the sum of four thousand dollars additional was voted for carrying on the work.

It is to be noted, to the credit of the regents of this western university, that they have not fallen into the error made by some other institutions, of attempting to do something with nothing, and inaugurating a veterinary department with but one professor to do the work requiring quite a number of specialists. We can see the influence of our colleague in this, who has ever determined that he would never be contented with any thing or institution which attempted to do a thing directly opposed to the live-stock interests of the country and those of the veterinary profession. The gratitude of the whole country, particularly the West, is due the Board of Regents of the Nebraska University for taking this stand upon a matter of such vital importance. They have the honor of establishing the first experiment station for the study of animal diseases in connection with medicine, or even where the sole work is research and where teaching is not made a necessity, of any American university, and thus have been the first to lead to the establishment of the principle which marked the successful advancement of preventive medicine in Europe. The veterinary profession of America may well congratulate itself that this important work has been done through the in-

fluence of one of its members, and that through him a path lies open which the human school can only follow in, but never initiate. Thus veterinary medicine is beginning to assume its proper place in the country. As a last word, we can only say that we earnestly hope that the regents of this university, who have seen fit to retain our colleague, will find no reason of becoming dissatisfied with the course they have pursued, and beg to assure them that every earnest member of our profession is with them in their desire to establish veterinary medicine upon the only true foundation—the scientific.

ORIGINAL ARTICLES.

GLANDERS.

By Veterinarius.

A Contribution for the Prize offered by the U. S. Veterinary Medical Association for Papers published in the American Veterinary Review.

(*Continued from page* 83.)

The Inoculation of Guinea-Pigs with Glanders Bacilli.

Dr. Loeffler experimented with eighty-five animals. The virus was introduced into the side of the abdomen by cutting through the skin with a pair of sterilized scissors and making a pocket with a steel needle. Each animal was placed in a separate box and they were then put in an isolated room. *Not a single one of the inoculated guinea-pigs remained exempt from infection.* The course of the inoculated disease varied in the different animals. At the locus inoculationis little was to be seen during the first two or three days. The edges of the wound were either adherent or covered with a thin eschar and slightly swollen. About the fifth day the locus inoculationis became tumefied; the edges of the wound hyperæmic; separated and secreting a purulent fluid eventually leading to the formation of yellow scabs. Finally an extensive ulcer developed with swollen edges and a purulent lardaceous base. The glands corresponding to the parts involved be-

came tumefied towards the end of the first week. The characteristic cord-like enlargement of the lymphatics, so common in horses, could not be felt. The glands, at first as large as a pea, soon became larger and their parenchyma underwent a purulent degeneration which eventually broke out externally. When this took place at an early stage the characteristic bacilli were easily demonstrated. The later this happened the fewer bacilli were present. In some of the animals no further external phenomena took place. In course of time the ulcerations healed and the animals again gained in condition. The induced disease assumed quite another course in the majority of the animals. The second week after inoculation a peculiar complication of the testes was noticed, consisting of small noduli in the testes and epididymis; the scrotum also became diseased; the folds of the tunica vaginalis became inflamed and adherent to one another and the skin, so that the skin could not be moved. The external skin became red and odæmatous; finally rupture of the noduli occurred, and on pressure a puriform material escaped in which numerous bacilli were found. In the females an intense tumefication and ulceration of the mamæ and labiæ developed. These affections are, however, under similar conditions, less frequent than orchitis in the male. Towards the end of the second week an eruption in the feet occurred, which were swollen, red, hot, and very sensitive on pressure. These conditions frequently disappeared in one foot and appeared in another; sometimes all four feet were affected; these complications frequently ruptured and gradually healed. Besides these very characteristic phenomena of glanders in guinea-pigs, local complications of superficial muscles were observed in other parts of the body, such as the face, where they developed from the periosteum and even complicated the osseous tissue, and sometimes caused penetrating ulcers in the nasal bones. The nasal mucosa was found diseased in about one-third of the cases, indicated by disturbances in the respiratory phenomena, but profuse nasal secretion was seldom observed; crusts on the alae nasi were frequent in such cases. When the affection of the nasal muscosa occurred it was generally the concluding act of the drama.

The animals generally perished in the third or fourth week,

sometimes the first or second, and occasionally extending to the seventh or eighth. The autopsy of such animals gave the following conditions: Inguinal and axillary glands tumefied, moist and lustrous; on section numerous centres containing a purulent material were seen; the whole gland underwent such degeneration and became enclosed in a capsule of indurated tissue. Abscesses of various sizes were found in the skin, many of which showed a tendency to heal. Some of the pedal joints were swollen, caused by the development of peri-articular abscesses and which extended into the tissues between the digits and often complicated the bones. The lungs contained many nodular neoplasms of various dimensions, many of which were surrounded by hyperæmic tissue; these noduli became more apparent after hardening in alcohol. No changes were observed in the heart. The spleen was affected in nearly every case and contained numerous greyish-white noduli, as also did the liver, but not nearly so many as the spleen. The kidneys were free from all neoplasmata and bacilli, and on cross section they were normal or slightly clouded in appearance. On the other hand the bacilli were found in the urine, their true character being determined by inoculation experiments. A few isolated noduli were occasionally found in the suprarenal capsules. Noduli, many of which had undergone puriform degeneration, were found in the omentum, the suspensory ligament of the liver and the retroperitoneal tissues. The intestinal tract was normal. When the processes on the testicle were of recent date they consisted of submiliary noduli situated in hyperæmic tissue; when older they contained large caseous centres, frequenty undergoing puriform degeneration or bursting externally. The ovaries of the female were not diseased in the same manner, but isolated yellow neoplasms were sometimes found. The mammæ frequently presented similar conditions. The nasal mucosa was red, swollen, and interspersed with numerous small lenticular ulcerations, frequently extending to or penetrating the underlying osseous tissue. The bacilli were easily demonstrated in all the products when fresh, in later stages with difficulty, as many of them undoubtedly perish when disintegrating processes commence. Fresh pulmonary noduli are especially useful for bacillus examination on

account of the great numbers generally present, and can be used for both covering glass preparations and study of the bacilli in situ in the tissues.

Experimental Diagnosis.

Dr. Billings found the kidneys in a case of chronic glanders in the horse free from nodular products, though interstitial nephritis was very marked, but cultivations from this kidney in blood serum showed the presence of bacilli that developed yellow vesicles, as described by Dr. Loeffler.

Dr. Loeffler found the bacilli in urine. I think this test should be used in regard to diagnosis of chronic cases of glanders in the horse. It has been shown that guinea-pigs are favorable for the study of experimental glanders, especially bacterial experiments, but are of considerable disadvantage in test cases for suspected glanders in horses, owing to the average duration of the disease being twenty-six days, and the characteristic phenomena are sometimes rendered uncertain by the appearance of an inhalatious tuberculosis; however, it is not difficult to diagnose between this and glanders in the guinea-pig.

The affections of the testicles, joints and nose, in glanders, and the peculiar colonizing of tubercle bacilli, are sufficient means of differentiation regardless of the macro-pathological difference in the appearance of the tubercle in glanders and tuberculosis. In such cases the various forms of pseudo-tuberculosis must also receive attention.

It was necessary to find some animal, if possible, that would reach against the inficiens of glanders in such a manner as to place the diagnosis beyond all question or doubt.

Numerous experiments were made with white mice, rats, birds, etc., but they were unsatisfactory, compared with those with the common field mouse *Arvicola Arvalis*. They must be kept separate, for if one dies the others immediately proceed to eat it. This animal seems to exceed all others in its susceptibility to glanders infection. Dr. Loeffler inoculated fifty with many different cultures of glanders bacilli and they died as follows:

4 in 2 days after inoculation.
23 " 3 " " "
9 " 4 " " "
8 " 5 " " "
4 " 6 " " "
1 " 7 " " "
1 " 11 " " "

The average duration of the disease being between three and four days. The course of the disease was almost always the same. The animals appeared perfectly well on the first and frequently the second day after inoculation, ate well, ran about and buried themselves in the saw-dust of their cages. They then became less lively, withdrew from observation or sat in one place, with rough-looking coats and adherent eyelids, rapid respiration and no appetite; they were then observed to fall on one side and die without any convulsions. The microscopical results were exceedingly characteristic but different from those observed in glanders in other animals. The locus inoculationis was infiltrated with a greenish-gray appearing mass, penetrating the superficial layers of contiguous muscles, and from this point lymphatic cords could be traced to their appropriate lymph glands, which were hypertrophied and more or less filled with greyish-white centres. Spleen enlarged and its parenchyma studded with yellowish-white noduli, frequently surrounded by a red anulus of distended vessels, and superficial neoplasmata were often seen above the surface of the capsule. The liver contained numerous small noduli, but they did not extend above the surface of the organ. The kidneys did not appear to have undergone any changes. The suprarenal capsules and ovaries were frequently the seat of small ecchymoses, with occasional yellowish-white nodules dispersed throughout their substance or upon their surface. Joint affections were observed in five cases, the most common seat being the pedal joint. They were swollen hyperæmic, and when cut a puriform fluid escaped. In one case all four joints were affected. Affections of the skin, besides those already mentioned at the locus inoculationis, were not observed. The nasal cavity was free from complications. Glanders bacilli were found in great numbers in the spleen, lungs,

and liver. The noduli had exactly the same microscopical appearance as the lymphomatoid neoplasmata described by *Virchow* and *Klebs* in ileotyphus. Bacilli were present in the centre of these objects in great numbers, frequently in the body of lymphoid cells, and in the cut section of blood vessels between the red blood cells. Cultures upon blood serum gave the characteristic yellow vesicles. It will thus be seen that the field mouse affords all the conditions that are necessary to test the infectious elements in glanders, and is especially valuable for inoculation in doubtful cases in the horse. This mouse is not affected by the bacteria of *mouse septicæmia* in contradistinction to the white mouse, while the latter is nonsusceptible to the action of *glanders bacilli*.

The Biological Peculiarities of the Bacilli in Different Cultivating Media.

As already mentioned glanders bacilli develop exceedingly well upon the stiffened blood serum from horses or sheep.

On the third day after being sown the bacilli appear upon the surface of the serum in transparent yellow vesicular colonies. On penetrating one of these drops gently with a platinum needle, and withdrawing same gently it will be seen to be connected with the colony by a very delicate thread of its substance, which shows that it possesses a tough mucoid, viscid character. The appearance of such a colony changes after it has been from eight to ten days in the *thermostat*. They lose their yellow transparency and become milk-white; this is especially marked when the cultivations were made upon greenish colored equine blood serum. A microscopic examination of these colonies revealed the presence of numerous rod-like organisms possessing a high degree of refraction, which at first gave the impression of large free spores, but proved to be quite otherwise, from their angular form and irregular size; they are undoubtedly small crystals, the precipitation of which causes the whitish change of color in the vesicles; the nature of these crystals was not determined.

The bacilli also develop in a similar but not so luxuriant manner in the stiffened blood serum of cattle. They also develop well in infusions made from the flesh of man, horses, sheep,

rabbits, dogs, cattle and fowls, with and without the addition of one per cent. peptone. At the termination of the second or third day the solution becomes clouded, and a mucoid precipitation appeared in the bottom of the vessels.

It was of great interest to decide if these bacilla would develop upon cultivating media of a vegetable nature, especially as cooked potatoes were an exceedingly suitable medium for such cultivations of *anthrax bacilla*. The result was most satisfactory. On the second day the surface of the cut potato was covered with a delicate yellowish transparent coating; on the third day all the potatoes were covered with a beautiful amber colored mass, consisting entirely of bacilla; from the sixth to the eighth day this color assumed a reddish shade, the transparency being lost; that part of the surface of the potato not occupied by the culture was of a delicate green color, while that of noninoculated potatoes remained greyish-white. Repeated cultivations demonstrated the constancy of these phenomena. Other bacteria also form yellow drops upon blood serum, so that microscopic differentration between them is a matter of difficulty. Dr. Loeffler says that the above appearances upon potatoes form a characteristic peculiar to the bacillus of glanders. A certain resemblance to this bacillus is also seen in cultivations of that of blue-green pus, but by *spreading a small quantity of the latter upon white filtering paper and subjecting it to the fumes of strong ammonia, you at once get the characteristic bluish-green color*; whitish-brown extension along the line of the inoculation puncture. To arrive at the most trustworthy results regarding the influence of temperature on the vitality and growth of the glanders bacilli, the following method of experiment was adopted. A small quantity of freshly distilled water was poured into a glass vessel used for the bacterial examination of air and a freshly sown potato was introduced upon the crystalization apparatus, and by the side of the potato a trustworthy thermometer was placed; the mouth was then closed with cotton, and over this a piece of thin sheet rubber was drawn to prevent the too rapid evaporation of the moisture. The apparatus was then placed in a d'Arsonoval thermostat fixed at a certain temperature. At 20° C. the bacilli did not, *which is not the case*

if you treat cultures of the glanders bacilli in a like manner. The microscopic examination of *pus-bacilli* shows them to be larger than those of glanders, and exquisitely motile. The observations of Kitt and Weichselbaum confirmed those of Dr. Loeffler, without their having any previous knowledge of his experiments. These experiments were proved upon guinea-pigs and field mice with the most satisfactory results. Dr. Loeffler kept one cultivation upon a potato medium from the 1st of April, 1883, to the beginning of July, 1884; it was found to have lost much of its virulence by experimental inoculation, as great quantities only caused slight local reaction in guinea-pigs. By means of these media the limits of temperature under which these bacilli thrive was determined.

In a meat-water peptone solution, with or without agar-agar, a morbid development of these bacilli could be distinguished at the ordinary temperature. The cultures in flesh-water peptone gelatine remained sterile under the same circumstances—that is, at a temperature of 15° to 20° C. At over 20° C., and at a degree which did not cause the gelatine to become fluid, but still affected its consistency, the bacilli developed in the shape of a proliferate; at 22° C. a spur of development was observed; at 25° C. the potato had a delicate yellow coating; at the end of five days, while at 37° C., a profuse development occurred within three days; at 27° C. the growth was not nearly so luxuriant; between 30° and 40° C. they seem to proliferate with a like rapidity and profusion; 41.5° C. somewhat checked the development; the color was already of an amber shade, and the individual colonies remained very small. The microscopic examination showed the bacilli to be very short, and to have a stunted appearance. At 43° C. they remained about the same, while all proliferation ceased when the temperature was raised to 45° C. The lowest temperature limit in which glanders bacilli retain their biological activity is a matter of the greatest importance. A temperature of 25° C. is no unfrequent occurrence for many days at a time during the summer months. It is possible that the fluids within such stables may provide suitable media for these bacteria to retain their vitality outside of the animal organism. It is well

known that in hot climates this equine malady acquires an extreme degree of extension, in contradistinction from Northern climates. According to Krabbe, there occurred in 10,000 horses in Norway, from 1857 to 1873, 6 cases of glanders yearly; in Denmark, 8.5; in Great Britain, 14; Sweden, 57; Wurtemburg, 77; Prussia, 78; Servia, 75; Belgium, 138; in the French army, 1,130; in the Algerian army, 1,548; which shows that glanders increases in frequency as we go from a northern to a southern climate.

Krabbe and Bollinger are, however, of opinion that this variation is due to the manner in which veterinary police laws are executed; but there is abundance of evidence to show that the climate must not be left out of consideration. This question caused Dr. Loeffler to endeavor to see if the bacillus of glanders would develop in the fluids of horse stables, and if they were able to continue an ectogenous existence.

All experiments in this direction gave a negative result, while the experiments upon potatoes were equally positive; hence an extra organismal development under such circumstances is not very probable. It was of importance to know whether the bacilli of glanders developed spores or not. The majority of observers have answered this question in the affirmative, but their assertions were based upon studies of microscopic specimens of the colored bacilli. Weichselbaum saw some granules which gave the appearance of the spores being inside the rods, and positively pronounced these objects to be spores. *Dr. Loeffler was unable to discover any spores after the most exact and detailed observation of the bacilli*, and he considers the polar coloring a phenomena of death of the middle portion of the rod, which had lost its affinity for coloring material, as has been observed with other bacteria.

This assumption is strengthened by the fact that very old bacilli loose their affinity for coloring material throughout their entire length. A question of such importance cannot be decided by microscopic examination alone.

METHOD OF COLORING THE BACILLI OF GLANDERS.

Covering-glass preparations from glanders material can be

made with aqueous solutions of the different aniline colors—methyl-blue, gentian-violet, and fuchsin—but the result is more satisfactory with other preparations, such as alkaline coloring solutions, prepared by taking three cubic centimetres of a solution of caustic potash, 1 to 10,000 parts of aqua, and adding to it a concentrated alcoholic solution of either of the above colors. Solutions of aniline water, gentian-violet or fuchsin, as used for tubercle bacilli, give very fine effects when mixed with the same quantity of the above mentioned potash salt, or a one-half per cent. solution of liq. ammon. fort. The addition of the alkali to all coloring solutions is very valuable in the study of bacteria; the coloring takes place more rapidly and intensely, and other organisms, such as the actinomyces fungi, which color imperfectly by the Gramm method, color beautifully with the addition of caustic potash.

The mixture must be made fresh each time, as the potash forms a precipitate in a short time with gentian-violet or fuchsin. Both the alkali and coloring material ought to be filtered before use. Float the covering-glass specimens in the solutions for five minutes, take out and dip for a second or two in 1 p. c. acetic acid solution, to which add sufficient trapacolin, O. O.; then wash specimens quickly in distilled water. The addition of trapacolin has the effect of removing the color entirely from the plasma of the cells, and somewhat from their nuclei, while the bacilli retain their color perfectly. This gives the preparations a peculiarly clear appearance.

By treating similar preparations with concentrated aqueous or aniline water solutions according to the ordinary methods of coloring bacilli, it is impossible to find those of glanders by subjecting them to the action of a fuchsin solution for twenty-four hours; a few may be discovered. The result is quite different when an alkaline solution is used. For instance, when an alkaline solution of methylen-blue is used, a section or covering-glass specimen has only to remain a few minutes in the mixture to color; then proceed as above with the combined solution of acetic acid and trapacolin, alcohol, and cedar oil; then mount in Canada balsam. When an alcoholic solution of gentian-violet or

fuchsin is used, the section must remain in it from fifteen minutes to half an hour. A solution consisting of 10 c-cms. of aqua distilli., to which has been added two drops of concentrated sulphuric acid and a few drops of five per cent. oxalic acid solution for the treatment of sections colored in methyl-blue, is much better than acetic acid trapacolin. This solution removes the color from the tissues and nuclei without having any effect on the bacilli. The duration of the action of this decolorizing agent cannot be exactly given, being a matter of practical experience, depending on the thickness of the sections of the tissues. Thin sections of pulmonary tissues should remain in the alkaline methylen-blue solution for two to five minutes, and then wash for five minutes in the oxalic acid mixture, then with absolute alcohol, cedar oil, and mount. It is an advantage to place the sections in a solution of caustic potash, 1 to 10,000 of aqua, for a few minutes before immersion in the coloring fluid. If the coloring has been successful, the bacilli will be very easily defined by their dark blue border. I found it better when using methylen-blue and an alkali, to allow the sections to remain in the coloring fluid for at least twenty-four hours; then transfer to the oxalic acid mixture, then into 60 per cent. alcohol, and then into a contrast stain eosin; from there into 90 per cent. alcohol, then into absolute alcohol and oil of cedar, and mount in Canada balsam. This method I found by far the most satisfactory. In old noduli the colonizing test is not to be depended on, the cultivation method being the most reliable. Glanders bacilli are thoroughly decolored by treating them with permanganate of potash in the same manner as Lustgarten claims peculiar to syphilis. By treating a fresh glanders nodule, according to Lustgarten's method, with permanganate of potash and submitting the same to microscopic examination, you will find a circumscribed cellular phenomena, in which the limits of the alveoli are filled with cells which are of an epitheloid character, as well as small round cells which also fill the interstitial framework. The capillaries surrounding the nodulus will be found distended with blood-cells, with an occasional diapedesis. In the center of the nodule bacilli can be seen collected in small groups, and closer examination demonstrates the presence of an

enclosing membrane, showing that they occupy the body of a cell in which the nucleus has perished. In old noduli the alveolar structure cannot be defined ; the center is occupied by a mass of detritus, parts of which stain a dense blue color. The detritus is not so dense towards the peripheries, and a few bacilli may now and then be seen, and sometimes a group within a cell. The bacilli cannot be seen in cross sections of blood vessels, or in covering-glass specimens of blood from the heart. Only in most acute cases have the bacilli been demonstrated in the blood, although they are undoubtedly present in acute stages of the disease, when noduli break through into the blood vessels. This is also the case in tuberculosis, as shown by Weigert and Koch. The more acute the course of glanders, the quicker the phenomena of generalization appears; the more probable will be the discovery of bacilli in the blood. This fact corresponds with the result of inoculation or transfusion experiments with the blood of glandered horses, which proved negative in the greater number of cases.

(*To be continued.*)

VETERINARY JURISPRUDENCE.

FORENSIC MEDICINE.

By D. P. YONKERMAN, Cleveland, O.

(*Continued from page* 34.)

As to medical secrets : The highest legal authorities in England have decided that medical men enjoy no special privileges with regard to secrets of a professional nature. In other words, no practitioner can claim exemption from answering a question because the answer may or would involve a violation of secrecy or even implicate the character of his patient.

But the courts of New York, with more respect for the honor and knowledge of the conditions under which the medical man becomes the possessor of secrets involving the character of whole families, have wisely passed the following law :

" That no person duly authorized to practice physic or sur-

gery shall be allowed or compelled to disclose any information which he may have acquired in attending any patient in his professional character and which information was necessary to enable him to prescribe for such patient as a physician, or to do any act for him as a surgeon."

Now that I have touched upon and endeavored to elucidate somewhat the character of evidence, it will be next in order to consider the subject of preparation for the witness box and the proper manner of giving evidence. The suggestions I am about to give you regarding the manner of giving evidence are offered with but one object—not to teach you to be skillful partisans nor defiant witnesses, but simply for this: that your evidence may be of such a nature, both as regards its arrangement and scope, that justice may be assisted by a clear and orderly statement of truth and the whole truth, and not perplexed by a disorderly combination of chaff and wheat, a hopeless entanglement of material and immaterial statements.

First, then, it is your duty to make yourself fully acquainted with and master of all the facts bearing on that part of the case upon which you may be called to give evidence. Your knowledge should be as far complete as possible. As an illustration of what I mean: no medical man is justified in venturing to give evidence on the results of an imperfectly conducted or half performed post-mortem. Because a death was sudden and you find on opening the thorax evidence of heart disease, you are not justified in neglecting the examination of the brain; death is sudden in some cases of cranial hemorrhage, and apoplexy may exist with it, or be caused by poisoning.

In all cases likely to be matters of judicial inquiry, *completeness of work* is absolutely essential, for two reasons: the one to avoid personal censure, and the other to further the interests of justice. Do not think yourself above a careful preparation for the witness-box; for the witness has a harder struggle than the cross-examiner (for it is easier to ask questions than to answer them). Hence by so much let your preparation be the more active and complete, and in this preparation arrange all your facts methodically and as far as possible chronologically; make your-

self perfectly clear on all dates and times. Where measurements, size, color, weight, etc., are matters of evidence, these should be carefully considered beforehand; sometimes an illustrative drawing is of great service in evidence. Thus, in describing cuts, stabs, bruises, enlarged joints, deformities, etc., a sketch of the injured part, showing the precise direction of a wound, at once renders the whole thing clear to the judge and jury, while simple description might fail. But though the drawing may be rough, remember it must be correct, or it is worse than useless.

Again, as an expert you will be called upon for opinions. The conclusions you would draw from the facts proved, demand your most careful consideration. The medico-legal opinion of any value, is the thoughtful, ofttimes tedious work of study and examination; and if in the quiet of your study you fail to come to any conclusions, do not attempt a wild conjecture in the hurry and excitement of the witness-box. To be accurate is ten thousand times better than to appear brilliant. Want of thought (laziness, in fact,) is a far worse crime than an error of judgment.

Before giving evidence, carefully distinguish between facts and opinions. That prussic acid and belladonna are deadly poisons are facts, but their precise method of action are matters of opinion. In giving evidence, use at all times when possible plain English. "A blood clot" is a better witness-box phrase than "an apoplectic extravasation." Speak of a bruise, rather than a contusion; of the belly, rather than the abdomen. Avoid exaggerated expressions.

In cross-examination never lose your temper; your best defence, if unfairly pressed, is perfect coolness. The honest witness can afford to be dignified. If you are asked a question that you cannot answer, at once admit it, with a plain, outspoken "I don't know." Nothing is more dangerous than for a witness to attempt to guess, for fear of being thought ignorant; for a manufactured answer suggests further questions, until at last the witness finds himself in a maze from which extrication is well-nigh hopeless.

But having once replied "I don't know" to a question, never

allow yourself to be further drawn out by the skill of counsel. For instance, you may be asked, "How long, in your opinion, was a certain wound inflicted before your attention was called to it?" To which you answer, and sometimes very properly, "I don't know." Take care; that is your ultimatum, for the next question may be, "Do you think it was a month before?" and should you be tempted to say "yes," the next question is certain to be, "Was it two weeks?—was it a week?" and so on, until your original "I don't know" appears, to say the least, ridiculous.

There are certain cases where counsel may compel you to say yes or no to a question. Having done so, however, you have then a right to insist upon giving any explanation you see fit; and seeing how practically impossible it is at times to answer a question by yes or no, a witness should always, if circumstances require it, insist on his right in this respect, lest his answer convey a wrong impression.

And now, in summing up the question of evidence, which I think is the most important (next to knowledge of facts) to the medical jurist, I can do no better than to quote the advice of an eminent jurist to expert witnesses.

He said: "Be the plainest man in the world in a court of justice. Never harbor a thought that if you do not appear positive, you must appear little and mean. Give your evidence in as concise, plain, and yet clear a manner as possible. Be intelligent, candid and just, but never aim at being unnecessarily scientific; state all the sources from and by which you have gained your information. If you can, *make your evidence a self-evident truth.* Thus, though the court may at the time have too good or too mean an opinion of your judgment, they *must* deem you an honest man. Never be dogmatic, or set yourself up for judge and jury; take no side whatever, but be impartial, and you will be honest."

We will next consider a few circumstances which may at times give rise to no inconsiderable amount of doubt or inquiry, and perhaps be the cause of much thought to the practitioner; but before reviewing some of the cases and questions which the

veterinary practitioner may meet with, a few remarks on their classification may not be amiss.

The veterinary medical jurist does not meet with the great variety of cases which fall to the lot of our medical brethren, the physicians. The life of a person can scarcely be said to depend on his evidence, as is often the case with the physician. An inheritance or the future welfare of his heirs may not depend on our findings at an autopsy, but these facts in nowise detract from the importance of those findings, for if the case comes before a judge or jury at all, whether a human life, a certain sum of money, or a person's rights and justification are at stake, all demand that truth and justice shall be done and the same exactness and obstacles may have to be overcome and combatted in the one as in the other, and the medical jurist can distinguish himself as well in a case where the mere rights, money or property of an individual are in the balance, as when a human life hinges on his knowledge or testimony.

I would be taking up too much of your time were I to consider the *modus operandi* of the various procedures which characterize the routine of the medical jurist. Suffice it to say, that facts must be sought and established, one (and not the least important) of which may be the death of the subject. It may seem to some of you an easy matter to do this, but after comparing the various signs of death and the numerous symptoms which frequently occur simulating death, you will find that in many instances it will require all your professional skill to even diagnose a case involving the question of death. I might here cite a case which came under my notice, in fact occurred to me.

I was called to see a dog, the pet of a family. When I arrived I found the dog—a skye terrier—apparently dead. I could not feel the heart beat, the eyes were glassy in appearance, and there was no movement perceptible. From these indications I did not hesitate to pronounce it dead, and the owner threw it into the yard, with a view to burying it on the following day; but imagine my surprise when the next morning both dog and owner walked into my office, the dog apparently in excellent health. Since this occurrence I have always found the majority of death symptoms present before I passed judgment on a case.

We can scarcely pass over the signs of death and their train of important circumstances; so I will briefly review a few of the signs and conditions of most interest to the veterinary medical jurist. The signs are divided into two classes, positive and minor; the positive signs are, first, the entire and continuous cessation of the heart's action; second, the entire and continuous cessation of respiration; third, insensibility and inability to move. The minor signs are included in the effects of heat or a flame to the skin; action of caustic; odor of death; changes in and about the eye; change in temperature; muscular flaccidity and contractility; commencement of putrefaction; the formation of adipocere. Any one of these signs require close attention, as they are greatly intensified or retarded by circumstances and conditions, such as exposure to air, age of the animal, effects of gases, moisture, chemicals, mode of death, etc. The position of a dead animal may be of importance in determining the cause of or manner by which the animal died.

The question might arise whether the body had been disturbed or tampered with since death. In deciding these questions we must bear in mind (admitting that in rigor mortis the flexor muscles are always a little more contracted than the extensors) that the position of the muscles at death, unless disturbed during the period of flaccidity (in other words, the position when rigor mortis supervenes), is the position during rigor mortis.

Without discussing numerous matters in detail, the following propositions are, I believe, scarcely open to question: If a dead and rigid body, with open eyes and dropped jaw, be discovered, fitting itself to the surface on which it rests, the muscles of the buttocks or other parts being flattened at the points of contact or pressure, the probability is that death occurred at the precise spot where the body is found. If there had been any interference with it, it must have occurred before rigor mortis set in. If a dead and rigid body be discovered, not fitting itself to the surface on which it is found or rests; that is, if the limbs be twisted and contorted while the surface is even, or conversely, if the body be straight and the surface uneven, the probability is that the place where the body is discovered is not the place where it died;

at any rate, it is next to certain that the body had been disturbed or otherwise tampered with after rigor mortis set in. The surroundings, straw, bedding, hay, etc., will also assist you in determining if the body had been interfered with.

In examining a body for bruises or injuries, care must be taken not to mistake cadaveric ecchymosis for bruises; their difference being familiar to you all, I will not detain you by describing them, but will go on to consider another and the last branch of forensic medicine which I shall touch upon in this paper. So I ask your still further indulgence while I endeavor to suggest a thought or two in connection with the post mortem examination. This is an inseparable part in determining the cause of death. So important is it that under no circumstances should it be undertaken under conditions of hurry, at an improper time, that is, by artificial light, when certain important appearances, such as discolorations of the tissues and traces of poison might and probably would pass unnoticed. In cases of grave suspicion, and where important issues are at stake, the post mortem should be performed by at least two independent experts. If the veterinary surgeon in attendance is in any way inculpated or his treatment called in question, it is undesirable for him to be present, although it is only fair that he should be rep resented by a friend.

I know of a case where a certain practitioner was charged by another with poisoning a patient with opium. A post mortem was ordered, and a friend was present on behalf of the practitioner. The examination was made by the doctor who preferred the charge. The post mortem revealed all the appearances of death by opium, but he did not state that the liver was in a complete state of fatty degeneration until questioned on that point. This would probably never have been brought out as the primary cause of death had not the representative of the practitioner who was in charge of the case been present at the autopsy. As a matter of prudence, therefore, neither the accused nor the accuser, nor, in fact, any one actually suspected, should be present during the operation, inasmuch as tampering with viscera and the contents of the stomach are circumstances not altogether unheard of in forensic medicine.

Thus I might go on describing the various precautions so necessary in forensic medicine, but as that is not the object of this paper, I have only hinted at a few things which I hope will set us to thinking and studying; for study, experience and observation are the three essentials to success.

Many cases come to us every year where the casual observer would be misled, particularly in the examination for purchase or sale of horses. While the deceptions practiced are ordinarily easy of detection to most of us, we occasionally require all our learning and experience to take us through.

While stock is owned, bought and sold, misunderstandings and legal complications will occur, and the veterinarian will be called upon very frequently to assist in solving some apparently mysterious circumstances in connection with loss, death, lameness or sickness of an animal, and the clearer his judgment, the more accurate his findings, the more manly and intelligent his conduct in all such cases, the greater will be the confidence reposed in his ability; and by his conduct the profession at large will be assisted to a higher plane of recognition from our judiciary, and by its influence receive substantial aid through the halls of legislation, thereby ennobling and raising it nearer the level of our medical brethren, the physicians.

REMOVAL OF CALK-BOIL BY LIGATURE.

By J. C. Meyer, Sr., V.S.

The generally unsatisfactory termination following the extirpation of such tumors induced me to select this mode of removal. Rarely do we find unusually good results recorded, even by renowned experts; still they all recommend excision of such indurated tumors which are obstinate to all resolvent remedies. Neither are there many supporters of the ligating procedure. Nevertheless, I determined that the next case that would be subservient to this purpose must undergo the experiment. Soon afterward the operation was put into effect. The elastic string was applied to the base of the boil. The groove between the ulna

and the tumor (which was hard, tough, free from pain, and of sound skin) was, notwithstanding its close adhesion to the former, sufficiently deep not to warrant a slipping off of the cord. The mare was returned to the stable, tied short, so that she could not reach it with the mouth. Showing no signs of discomfort, she was turned out to pasture two days afterward, from which she escaped the first night, and was not found until the third week, minus the cord, and the swelling so much diminished that resolution of the remainder could be relied upon. Thus my real aim was frustrated.

About a year ago, January 16, I was asked to perform the same operation on a carriage horse valuable for his reliability. The calk-boil attracted so much attention that the owner concluded to have it removed. The circumference at the base of the boil was 12 inches, without a pedicle-like diminution, hard and slightly sensitive. Upon parallel traction a string could be placed between the tumor and the ulna; not deep enough, however, to insure against displacement by the ensuing swelling. To prevent this, narrow tape was drawn through the skin at the base and partly on the morbid growth, and knotted so as to make a small loop. This was done at four different places, each about three inches apart. The elastic tubing of $\frac{1}{8}$ inch calibre was then passed through these loops twice, drawn tightly, and knotted. The horse was sent to his stall, tied short to prevent his lying down, and ice water applied for a whole week. The first three days the application was made hourly, and for the rest of the week every three hours.

Jan. 19.—Tumor somewhat diminished.

Jan. 21.—The enlargement same as on the third day, the hair underlying the bandage loosening. The constriction renewed, though not called for by relaxation of the cord nor any other deficiency.

Jan. 23.—Neighboring region somewhat swollen and sensitive. Skin next the outer border of the string separating from the tumor; an offensive watery secretion oozing therefrom.

Jan. 25.—Reapplication of the cord because the tissues had given way, about an inch deep. The exposed wound surface ap-

pears bluish-red, soft and flexible. Adjacent tumefaction diminished. The movement of the extremity stiff.

Jan. 27.—Gait still impeded. The remainder of the connecting medium of the tumor and its abode is about one-fourth, around which the cord is drawn closer.

Jan. 29.—The one-inch pedicle on which the abnormal growth now hangs is cut in two, after giving it another and last strangulation with a silken cord.

The separated compact tumor weighed 2½ pounds. The wound surface, measuring fully eight inches in diameter, was covered with a protuberance of about 1½ inches or more of superabundant granulations, which developed in less than thirty-six hours, and was not very promising for a speedy cure, so that the owner intimated that the second crop would not fall short of the first. However, the most sanguine hopes were realized. A concentrated solution of carbolic acid was applied every four hours on the fungoid formation.

Feb. 5.—The luxurious growth was under control. The rest of that auconæous appendage was cut off, which bled a trifle. Swellings on some of the pectoral muscles subsided; gait normal.

March 1.—The wound surface was even with the skin. The circumference diminished to about one-third. Phenylic acid and liq. ferri. sesquichlor. had thus far been applied alternately. From now on until cicatrization was accomplished, some time in May, villate solution was used.

Now that the hair is long, no one would notice the insignificant smooth and soft scar, unless attention was called to it.

I am not prepared to determine the effect of the cold fermentations, but the inflammatory reaction was not as severe as expected.

Whether there is any advantage in taking an elastic ligature for this purpose, I do not risk to judge from this single experiment. Reliable authorities—Prof. Dieckerhoff and G. W. Schrader—in giving their experiences on this special subject, recommend the common hemp string, by which they attained excellent results.

As soon, however, as opportunity offers (I have been looking

for one ever since, but in vain), I shall use the rubber tubing again, as it rendered me satisfactory services in ligating other tumors, among them two on the tail (melanotic), one on the hock joint, and one on the scrotum. All healed off without interruption. In short, this method is, in my opinion, preferable to extirpation.

THE ETIOLOGICAL MOMENT IN AMERICAN SWINE PLAGUE.

REPORT OF THE WORK DONE IN THE LABORATORY OF THE STATE UNIVERSITY OF NEBRASKA FOR THE EXPERIMENTAL STUDY OF CONTAGIOUS AND INFECTIOUS ANIMAL DISEASES.

(*Continued from page 66.*)

THE MOST PRACTICAL METHOD OF OBTAINING PURE CULTIVATION FROM THE TISSUES OF DISEASED ANIMALS.

Pathological exudations, such as used by Dr. Detmers, serve very well to inoculate animals with, either to test the character of a disease, and if contagious or infectious, to obtain, in most cases, absolutely pure cultivations of the germ by inoculating some sterilized gelatinous medium with the substance of some solid organ, with every precaution against contamination by adventitious germs. At the same time some small animal should also be inoculated from the same organs. When possible, the animal from which such material is taken should be killed rather than allowed to die. The cultures soon grow. They are examined and the pure ones used for the successive cultivation of any desired number of generations. At the same time the growth of the organism may also be tested in and upon any other media than the one first used. For primary cultivation agar agar and sterilized blood serum are most advisable, as they permit the use of the thermostat. In the meantime, the animals inoculated become ill and may be killed and tubes inoculated from their blood and tissues under due precautions; the resulting developments are then to be compared with those first obtained by microscopical examination and their deportment in the various media of cultivation. By this method one is enabled to get the organism in a

clear and isolated form at a much less expense to the eye and time than in any other.

Animals are then to be inoculated from the cultures, especially the species in which the disease occurs under natural conditions, and if the same clinical and necroscopical phenomena result, under these experimental conditions, and the same germ can again be cultivated and is invariably found in the blood and tissue, its pathogenetic history has been in part discovered. Cultivations should be made from every animal inoculated, but in the future, when making field autopsies, it will suffice to consider the natural phenomena and to examine the blood and fluids by object glass specimens. In obtaining material for cultivations from autopsies made in the field, it is best to have two one-gallon pails, made of heavy tin, with very tightly-fitting covers. One of these should be kept full of a five per cent. solution of carbolic acid and taken to the field in that condition. In the other should be a number of perfectly clean large napkins, soaking in the same solution, which should also be taken to the field in the same manner. The first pail should be emptied as soon as the operator is ready to remove the organs, which should be done as rapidly as possible. An assistant should be on hand, and as soon as the organ is free immediately wrap it up in one of the above-mentioned cloths, which he has previously wrung out, and so on with each organ. This serves to sterilize the outside of the organs, and they are ready to obtain cultures from, on arrival at the laboratory, which must be done with all the precaution of hot knives, etc.

The plate culture isolation method can also be used at any time, but the above is far more practical for primary studies.

PERSONAL OBSERVATIONS UPON THE BACTERIUM OF SWINE PLAGUE.

The micro-organism which, independent of any previous investigations by others, I have discovered and experimentally proved to be the cause of genuine American swine plague—the most common and frequent as well as devastating of all the porcine complications popularly termed "hog cholera," so far as we now know—has been obtained, in the previously described man-

ner, from every outbreak of "hog cholera" which I have visited in Nebraska during the summer, fall and winter of 1886. The first hog I examined was upon July 8, and I was fortunate enough to have a pure cultivation of one bacterium in every tube inoculated.

The field examinations and experiments will be reported in a future paper.

This organism is very minute, and requires at least 1-18 oil immersion, aided by the Abbe condensor in order to study its peculiarites successfully. My own work has been with an instrument made expressly by E. Leitz, of Wetzlar, Germany, which, while not costing as much, was proved by the most exacting tests to be equal to the best Zeiss; it is provided with a one-twelfth, one-eighteenth, one-twentieth oil immersion, the latter of which I have used in these studies.

For a long time I have been of the opinion that we are not exact enough in the differential choice of our language when speaking of phenomena of micro-organismal life, especially with regard to the differentiation between morphological and biological phenomena.

Morphological phenomena have reference to shape, size, outline, alone.

Biological to everything else connected with these organisms.

The mistake is too often made of speaking of the appearances of the micro-organisms, when colored, as morphological appearances, whereas they are unquestionably of a biological, chemical character; dependent upon the chemical affinities of certain parts of the protoplasm for the different coloring materials. While unquestionably, as in the case of the micro-organisms of the American and German swine plague, the "wildseuche" of Germany, rabbit and mouse septicæmia, and those of some other diseases, this coloring reaction of the germ differentiates its protoplasm into two distinctly separate materials chemically, and this differentiation manifests itself, to the eye of the observer, in a certain morphological sense; still the phenomena are of a biological and not morphological nature.

Again, the artificial cultivations of micro-organism in or upon

different media have their essential biological phenomena, in that the cultivations frequently assume certain characteristic forms in some special medium.

The condition of biological research, with regard to the pathogenetic micro-organisms, is fast getting so contradictory that investigators will soon have to come to some definite understanding as to the technical meaning of words in order to understand one another. In no sense is this fact so apparent as in regard to the oval organisms which seem to belong to the class of diseases which will eventually be known as the infectious septicæmia.

Koch has given the name "bacteria" to this class to distinguish them from the absolutely round organisms, micrococci, which color homogeneously, and the rod and twisted organisms. It is greatly to be regretted that Hueppe has lately thrown the whole question into chaotic confusion by classing everything but the various straight and twisted rods or threads as "micrococci," which should never be accepted or brought into general use.

The micro-organism of the true American swine plague is, then, a bacterium in its mature form. It is not a micrococcus.

It is oval, being at least twice as long as wide when fully developed, its length as a mature individual being about one-half the diameter of the red blood cell of a hog when examined in freshly drawn blood under the microscope and care is taken that no atmospheric or chemical influences interfere with the morphology of the blood cell.

It colors best in methylen-blue and methyl-violet, next best in gentian-violet and methylen-green, also very well in the other violets, especially in a variety known as Hoff's violet, but not as well as many other organisms in fuchsin. As has been pointed out by Loeffler and others in Germany, the coloring capacity of many of these dyes is increased by adding to saturated solutions of the same in the coloring glass an equal quantity of a solution of caustic potash 1-10,000 aqua.

The same must be fitted every time before using.

In coloring this organism the result will somewhat depend upon the length of time the covering glass specimen is exposed to the action of the coloring material, and the same is true with

regard to the action of alcohol in the dicolorizing of tissue specimens.

When not too intensely colored, its protoplasm will be found to consist of two chemically different materials which differentiate themselves over the body of the cell, so that the two poles, or ends, are of a more or less intense blue, violet, green or red color, according to the tinction used, while the center of the body remains colored. That the outer cuticle, or capsule, of this organism is composed of the same chemical elements as the plasma of its poles, is to be seen from the fact that a delicate line of the same color extends from each of the colored poles along the sides of the object to the other, embracing the uncolored substance or middle of the body. * * * *

What has been said above as to the tinction reaction of the only true germ of American swine plague proper, can never be controverted when the same materials and methods are used.

An intense degree of exposure to the coloring material will result in the clear space, or middle piece, of the cell-body also becoming colored, though not so intensely as the ends in general. It has been my experience that this uncoloring substance, under previously mentioned conditions, possesses somewhat more affinity for fuchsin and the red violets than for the blues and blue violet dyes. Methylen-green differentiates the protoplasma of this cell beautifully, but requires longer exposure than the blue and violet coloring materials.

This non-refraction, uncoloring substance, is a secretion of the pole-ends.

The pole-ends possess a much more intense degree of refraction, in uncolored specimens, than the middle piece; in fact, when examined without the Abbe condenser, these objects look like two micrococci very near together, and at one stage of their development absolutely like dipplo-cocci, or when three or four are attached together, like an attempt at forming short chains of streptococci, though I have never seen them build continuous chains. With the Abbe condensor and a competent lens, the white, non-refracting substance can, however, always be distinguished, save at one moment in the existence of this organism,

when the pole ends have an absolutely round, coccoid form. All these phenomena can be seen in an uncolored specimen, or in the living organisms in a stage of active proliferation in the so-called "hanging drop." Naturally, they can be still better seen when the coloring glass specimen has been colored. With regard to the hanging drop cultures, I have found it advisable to add a small amount of a freshly filtered aquous solution of coloring material to the sterilized boullion of the drop cultivation; the organisms take up the color at the pole ends, or refracting points, and become still more distinct. When added properly, the coloring material does not seem to affect their vitality.

Saturated alcoholic solutions of the dyes must not be used for this purpose.

Of all the micro-organisms it has ever been my lot to study, either in covering glass specimens, in life, or in tissues, this group of bacteria, with clear centers and colored ends, which form the sporules, is the most puzzling. One is certainly at a loss, at first, where so many cocci come from; this perplexity can never be overcome except by studying the developing phenomena of these micro-organisms in the hanging drop.

One sees cocci of various sizes and oval organisms of the general dimensions of the larger cocci, groups of three or four elements attached together, bodies end on, appearing like micrococci, and the mature object with its refracting ends and non-refracting middle piece, but never rods.

All these conditions or biological phenomena constitute a pure cultivation.

The method of proliferation is as follows:

First let me say that this micro-organism is most actively mobile in fluid cultivations, and that every one of the (to be described) biological phenomena can be seen, and are better seen, in a fluid culture than any other way.

The first biological phenomena to be seen—apparently so, at any rate—is the augmentation of the quantity or extent of the non-refracting (uncoloring) substance. This portion—the middle piece—of the micro-organism becomes longer, but no thinner. The refracting poles are thus placed at twice or even three times

the distance from each other which they occupy in the mature organism.

The next phenomena is—if you catch it!—an increase in length of the entire object and the diminishing in volume (thickness) of the non-refracting substance; the pole ends become longer and are only connected by a delicate thread of non-refracting substance. Detmers saw this distinctly, and describes it when he says: "If circumstances are favorable, especially if the temperature is not too low—a well taken point—these chains break up into smaller ones, consisting of one, two or more bispherical micrococci, which, in separating from their neighbors, spin or draw out a very slender thread."—Report, 1880–81, p. 187.

"The space, however, gradually widens till finally a separation takes place and each link or joint goes its way. * * * A competent objective will reveal the existence of an exceedingly slender thread—a flagellum—which gradually lengthening and finally snapping apart, constituted the connection between the separating joints. I have repeatedly seen a post flagellum, but so far have never seen one at both ends."—*American Naturalist*, vol. 16, p. 202.

The connection now breaks, and you have before you two large, coccus-like objects. The next act in the play requires educated and tireless eyes to catch it to perfection. The separated coccoid objects do not remain long round; they soon become oval by an apparently swelling process; the longitudinal diameter exceeds the transverse. In the meantime others have been going through the same process; others have remained attached to one another, for it sometimes happens, though not so frequently as has been said, by any means, that two or more objects are attached to one another and undergo this process together. If an object glass specimen be colored at this stage, the observer will see a most varied picture—it will almost always be so in examining cultures—consisting of large round cocci, smaller ones, the oval, or mature organisms with their peculiar ends and non-colored middle piece; and sometimes several of them united together; the first stage of proliferation when the object is two to

three times its mature length, the two colored ends still more distant from one another and connected by a fine filament. The next step is the ovoid coccus which has colored diffusely; it becomes still more oval; from it now develops the mature organism; the oval object increases, so slightly, in length, and a delicate, non-refracting, non-coloring or white line separates it into two parts and increases very rapidly in quantity, separating the two refracting ends which bound it on either side.

The mature organism is again before your eyes!

This phenomenon can best be seen in the hanging drop culture to which some coloring material has been added.

When the artificial cultivations have been held at a temperature under 25° C., these organisms assume a sort of dwarfed development; their bodies become shorter, or if of normal length they are thinner; the ends and non-colored middle piece being no longer so easily differentiated; the white substance is scarcely perceptible, and the coccoid ends smaller. In one culture one can see a perfect swarm of coccus-like objects of all dimensions, but none so large as in freshly sowed cultures. Such cultivations must be re-inoculated upon fresh material very frequently. They retain their vitality best upon blood serum or in boullion. They do fairly well upon sterilized agar agar, peptonized meat infusion developing in a dirty white mass. They develop rather poorly in gelatine, yet cultivations in this medium have more or less biodiagnostic value. In quite old gelatine, which has become somewhat hard from evaporation, but not hard enough to crack upon puncturing it, they develop slowly and in small colonies along the line of puncture, which gives to the same the appearance of a delicate thread with small knots at intervals along its course; the knots corresponding to individual colonies. Cultivations in such old gelatine do not have the tendency to spread over the superficial surface that they do upon freshly made gelatine, because of the hardness of the surface and the want of sufficient moisture.

In freshly made meat infusion peptonized gelatine, the first seen bio-pnenomena are somewhat dependent upon the size of the wire and number of germs upon it, when the medium is inoculated. If the wire is delicate and the number of germs small that

are attached to it, the individual colonies will develop as in the older gelatine, especially at first; but they soon grow larger, and finally coalesce, forming a continuous development along the line of puncture. Along the sides of the same, the small, individual colonies are indicated by its delicate serrated appearance. I have seen this organism, when inoculated into old gelatine, retain the isolated colonial appearance for a period of two months without any attempt at coalescence between the colonies.

They never cause the gelatine to become fluid.

They are as anærobic and ærobic; that is, develop equally well with or without contact with the air. They develop as a sharply circumscribed coating of a grayish-white color upon the surface of freshly made gelatine, but not too profusely.

They lose their virulent activities quite rapidly in, or upon, artificial cultivations, but not so rapidly when access to the air is shut off. Thus far I have only been able to test their virulence upon a very limited number of rabbits, mice and rats, and have tested them by some forty experiments upon hogs, on account of paucity of funds.

They will kill rabbits, when a small quantity (two drops) of a fresh and virulent culture is used, in from three to five days, and mice in from twenty-four to thirty-six hours. Rats succumb to larger quantities (ten drops) in from thirty to forty-eight hours, or more. Their action upon hogs varies greatly according to the amount injected and the locality chosen for such interference; but above all, the germs vary very much in virulence in different outbreaks and in different localities, even when pigs or hogs are inoculated directly with a piece of freshly removed spleen rubbed up in sterilized boullion. How long cultivations will retain their virulence I am unable to say at present, but I have been successful with a proportionately large quantity of the tenth generation of the first cultivation, on the 28th of October last, the material having been obtained the July previous.

They develop fairly well on potatoes, the colonies assuming a rich coffee color; that is, of good coffee when good cream has been added to it. On beets, turnips and carrots I have not observed any particularities worthy of mention.

The peculiar differentiation of this organism into refracting and non-refracting substances, said substances representing also a coloring and non-coloring material when properly tested, as well as its varied and peculiar biological modifications, have probably been the reason that this micro-organism has not been more accurately studied and described by previous investigators, especially by Dr. Detmers. These conditions demand the utmost consideration as well as most exact and delicate technique in studying their presence and location in tissues. They collect in large numbers in the capillaries, especially in those of the lungs and kidneys. The utmost precaution is necessary in the discolorization of tissues, The "Gramm method" applies well to them, but they can be colored equally well without it; twenty-four hours' exposure is necessary in order to obtain satisfactory results. But whatever is done, it will only be under very favorable circumstances and in the thinnest of sections and after the most artistic treatment one can find them in tissues where the full differentiation of their plasma can be distinctly seen. It can be done in every organ, but requires time and patience. In thick sections, or even in thin ones, the commonly seen object will be a coccus; if the section is not stained with some contrast color, the tissues themselves, being discolored, will interfere with one's seeing the uncolored middle piece, and the same is true of the contrast colored specimen, unless the organism is in a very thin section, and near its upper surface, and then lies transverse to the observer's eye; if end on, they appear as cocci; if oblique, the lower end is not seen, and a coccoid object only is visible.

In my full and final report to the Board of Regents, these conditions will be discussed in detail and fully illustrated by drawings from microscopical specimens.

As one of the purposes of this paper is to endeavor to place this organism into the class of Koch's "bacteria," as opposed to the latest views of Hueppe, I desire to call attention to two other organisms which I have come across in two entirely different diseases.

The first of these micro-organisms was found in the organs of the cattle killed by my orders in connection with the singular out-

break at Crete, Neb., which I have termed "Bovine Rabies," on account of the history given me, and also because the phenomena in the sick animals so exactly fitted into the descriptions of rabies in cattle as given in the most reliable text books on animal diseases. [See AMERICAN VETERINARY REVIEW, January and February, 1887.] I can only say this, that if the disease was not rabies, then it is one that simulates it in every particular, and one never before described by any observer. The fact that I have been able to isolate one form of micro-organismal life in absolutely pure cultivations from the brain, spleen and parotid glands of these animals, makes me doubtful of its being rabies, because so many others have tried to do the same thing and obtained no experimental results. On the contrary, I have obtained a most singular result, which, summed up, is as follows: Dogs inoculated subcutaneously with four fluid grammes of a sterilized boullion culture, have died within two weeks from a general paralysis, beginning in the posterior extremities. One rat died under the same symptoms in exactly nine days from the time it was inoculated. In both cases the animals could not swallow; the mucosa of the stomach was injected and swollen and intestinal tract contracted. Further particulars I cannot give at present, and it would be useless to theorize upon them.

This microphyte undoubtedly belongs to the same species as that of swine plague, if such objects can be classed by their morphological and morpho-biological characteristics so far as artificial development is concerned. I shall show, however, that these characteristics are not enough to justify claiming identity for any two organisms that are apparently similar, *and that the one decisive test must be the experimental results in animals being exactly the same as occurs in natural infection.*

This organism has, as said, nearly every characteristic of that of swine plague in artificial cultivations, but it is much more difficult to keep it in an active state of extra organismal proliferation. When the cultures are fresh and one sees it in its mature form, it is slightly longer than the swine plague organism and has more non-refracting, non-coloring substance; it is also somewhat thinner, and the refracting, colorable pole-ends are not only smaller, but

more pointed; it presents all the difficulties of study that the swine plague organism does, but to a greater degree, because it thrives so poorly in all tested media; it is especially prone to what in these cases I call coccoid degeneration. It is an-and ærobic in gelatine, but does not form the isolated colonies in old, or other, gelatine along the line of puncture in any stage of its development. In contradistinction to the S. P. organism, it spreads very slowly over the surface of the gelatine, forming a dead-looking, non-lustrous crust, especially if the gelatine is not very fresh, which is very difficult of removal, requiring hard scraping with the wire to get any material, and then breaks up into small dry, crustaceous particles. It developes well on agar agar at 37° C., but the organism will be found very much dwarfed upon microscopic examination, except in freshly-sown cultures made immediately from the organ from a diseased animal. In old cultures, or after repeated cultivations, the latter will be found to consist almost entirely of coccoid objects of varying dimensions. Its best medium is sterilized blood serum. It does not cause the gelatine to become fluid. It colors best in fuchsin and well in the blues and blue-violets, but not well in the red-violets. Want of means has prevented the careful experimental testing of this organism, especially in cattle. Sub-meningeal inoculations have no value for me. If it should be the organism of rabies, it must produce it under as nearly natural conditions as possible—that is, by subcutaneous inoculations; and last of all, inoculated dogs must induce rabies in healthy ones by biting them, to make the evidence conclusive.

The other micro-organism was obtained from the freshly removed spleen of a heifer said "to have died from Texas fever," and placed in my hands within thirty minutes from the time the animal died.

Numerous inoculations were at once made from it upon sterilized agar agar under the usual precautions. This organism has not been properly tested, for want of means to procure suitable animals. It will kill mice in twenty-four to thirty-six hours. It required seven days to kill a rabbit, the animal having a severe diarrhœa towards the end and suffering from acute parenchymatous nephritis, with albumen and casts in the urine, but no blood.

This object retains its virulence under artificial conditions much longer than either of the others.

It is also oval, hence a bacterium.

It colors well in the usual tinctions, but diffusely, and does not differentiate into two different substances as the others do. On account of press of work, its manner of development has not been studied. Contradistinctionally to the other two organisms, it grows well in gelatine along the whole line of puncture at once, the individual colonies being marked by the delicate serrated appearance of the line and ends as an individual colony, the whole appearing like a pin upside down—(when large quantities of material are upon the wire, the S. P. organism gives about the same appearance in fresh gelatine). It also spreads over the exposed surface of the gelatine, as a delicate, lustrous, pearly gray coating, with great rapidity. It generates offensive gases, or a gas, which frequently form globules in the substance of the gelatine.

It does not cause the gelatine to become fluid.

My readers will, therefore, please take notice that here are two organisms that bear much similarity to that of S. P. in their manner of development, and that all three represent three absolutely distinct micro-organisms, as they are each from sharply different diseases—clinically—though they must all be classed as "bacteria"; that they are oval organisms, all having much in common in their artificial development; that neither fluidities the gelatine, yet they have essential biological points of differentiation, the chief of which is that they each produce different clinical and necroscopical phenomena.

To this group of micro-organisms also belongs that of the German "schweineseuche," or swine plague, which it has been very hard for me to accept as identical with the American disease, but which recent experiences and more exact studies have about convinced me to be in reality the same disease. (My former position on this question can be seen by reference to the paper upon "hog cholera" read by my assistant, Dr. Thomas Bowhill, before the Ilinois Veterinary Association, Nov. 11, 1886, and published in the AMERICAN VETERINARY REVIEW, December, 1886, and January, 1887.) My reasons for this change of opinion will be alluded to later on and treated in full in two papers—one upon

the nature of swine plague, and the other upon the pathological lesions of that disease. There are still other micro-organisms belonging to the same group, such as those of rabbit and mouse septicæmia, and the disease of wild and some domestic animals—deer, cattle and swine—known in Germany as the "wildseuche," (to which Hueppe has lately given the name of "septicæmia hæmorrhagica"), and, according to Hueppe, hen cholera also.

My chief reason for considering the question of the nature of the swine plague organism in advance of my full report to the regents of this University—which will be postponed until the whole story is completed—is that Hueppe has lately endeavored to show that all the diseases mentioned by him are etiologically identical, *because of the similarity of the morpho and biological phenomena of their germs under artificial conditions of life.*

The reason also of my introducing the two "unknowns,"—as I will call the bacteria previously mentioned—here is simply to say that if Hueppe is correct in classifying the micro-organisms of the disease mentioned by him as one and the same thing, he would be equally justified in claiming the same for these two unknown germs; for they are as nearly like the others in their morphological and cultivation appearances as those mentioned by Hueppe are to each other; it would also be just as logical, supposing these unknowns to be the cause of rabies and Texas fever, respectively, to assert that these two diseases are identical with the German "wildseuche" as it is for him to claim that the "wildseuche," "rabbit and mouse septicæmia," "hen cholera," and the German and even American swine plague are etiologically identical diseases; that is, caused by one and the same micro-organism.

(*To be continued.*)

EXTRACTS FROM FOREIGN JOURNALS.

INJECTION OF PURE TINCTURE OF IODINE IN SALIVARY FISTULÆ.

The injection of irritating substances into the ducts of the salivary glands, that of Stenon especially, in many instances proved to be the best mode of treatment in cases of salivary fistulæ re-

sulting from injuries to the excretory canal of the gland, and of all the substances which have proved most advantageous none have been found more useful in its applications than the pure tincture of iodine. The *Revue Veterinaire* of Toulouse reports two cases in which fistulæ were thus treated with excellent results, though with different phenomena:

1. M. Delamotte records the first case. It is that of a fistula of the left side, resulting from the cauterization of a sarcomatous tumor of the cheek with arsenious acid. Into the open mouth of the duct, 60 gramms (about two ounces) of pure tincture of iodine were slowly injected in such a way that the injection could reach not only the canal and its affluents, but also the acini themselves. A few hours afterwards, the parotid was quite swollen. A large œdematous swelling appeared, extending from the poll, the base of the ear, and the eye, upwards, down into the jugular groove. While the animal was eating, there was no escape of saliva from the fistula's opening, but a peculiar roaring and double expiration at the flank were noticeable. The swelling of the glands subsequently subsided, and excepting the formation of two small abscesses, which healed readily after being opened, no complication was observed and complete recovery took place in twenty-three days, but with the result of the complete destruction of the parotid secretion.

2. In a second case Professor Labat, of Lyons, injected the pure tincture of iodine into the Stenon duct of an animal which had been suffering with epithelial growth of the face, which had been treated by caustics, and by which treatment a large sloughing surface had been exposed. Two hours after the injection, the parotid region began to swell, and the next day the enlargement extended all over the gland into the maxillary space over the masseterine region and somewhat down the neck. This, however, soon began to subside, and towards the sixth day had entirely disappeared. The fistula, however, was entirely closed, and on the fourteenth day the recovery was complete.

ANTISEPTIC WADDING.

In a series of articles, Mr. Ray considers the advantages that will result in veterinary practice from the use of the ordinary or

antiseptic wadding in the dressing of wounds. According to the author, this mode of application possesses over the ordinary oakum method advantages which he recapitulates as follows:

1. The pressure which can be applied with wadding is soft, uniform and methodical.

2. It preserves an even temperature over the surface of the wound—it protects the parts much better against external injuries, and again (though this point is still in dispute) it protects the wounds against the effect of the access of surrounding microbes by acting as an excellent means of filtration.—*Revue Veterinaire.*

STRICTURE OF THE SPHINCTER ANUS—SUBCUTANEOUS MYOTOMY—RECOVERY.

A young cow had been for a long time suffering with constipation. It was only after violent efforts that she succeeded in passing a small quantity of fœcal matter. The general health had been fair, but of late her appetite had become capricious, and she began to lose flesh. Every form of treatment failed to give her relief, though by injections and feeding her with grass she seemed to improve somewhat. The fœces she passed were rather soft, and when ejected were thrown out with some strength through the contracted anus. Rectal exploration was very difficult and painful. The walls of the rectum had the normal thickness and suppleness and the mucous membrane was soft and smooth in its whole extent. While the exploration was made the arm was subjected to violent pressure from the sphincter, which, with the posterior extremity of the rectum, felt like a hard ring, regular in its whole circumference and free from adhesion to the skin or to the mucous membrane. It was, in fact, the sphincter anus and the corresponding extremity of the rectum, which was transformed into a regular ring, powerfully constricted. This diagnosis being accomplished, a subcutaneous section to the right and to the left of the ring was made with the curved blunt tenotomy knife, and without any complication, and but a slight hæmorrhage, the animal was relieved.—*Revue Veterinaire.*

SURPRISING FECUNDITY IN A COW.

By Mr. E. Claverie.

This is the case of a cow which, at her first pregnancy gave birth, after an easy parturition, to one male and three female calves. The process of delivery occupied about an hour and a half. The little ones were well developed and were all doing well.—*Revue Veterinaire.*

THE USE OF ANTIPYRINE IN VETERINARY MEDICINE.

By M. Kauffmann.

In the *Journal of Zootechnie* the author, after giving the entire history of antipyrine and its physiological effects in healthy animals, concludes by speaking of its therapeutical indications. He says: 1st, in therapeutics only the effects of antipyrine can be utilized, as the local effects are nearly null; and, 2nd, that among the general effects the most remarkable, and the one that must unite the most common and important applications, is its hypodermic action. From all the investigations he has made, the author, confirming those of many others, concludes, 1st, that in hypodermic injections, antipyrine lowers the temperature more rapidly and better than by internal use; 2nd, that by this mode smaller doses give better results than if administered through the stomach; 3d, that for hypodermic injections the best solution is that of one gramme of antipyrine to fifty centigrammes of water, the solution being made with heat; 4th, that the hypodermic use is never followed by any general or local trouble; 5th, that in very high pyrexia larger doses must be administered every hour; 6th, that it can always be substituted with advantage for the use of quinine.

Kauffmann recommends the following doses for subcutaneous injections: In a dog of medium size, one gramme, and in a horse of medium size, ten grammes. This dose may be repeated, however, until the temperature is diminished.—*Journal de Zootechnie.*

GLANDERS IN THE GUINEA PIG.

By MM. Cadeac and Malet.

On account of the great facility with which this little animal

can be used in cases of the doubtful diagnosis of glanders, the following five modes of inoculation are recommended:

1st. The insertion of solid pieces of virulent matter in a fracture made subcutaneously. This is best adapted for glanderous granulations or thick pus.

2d. Deposits of virulent discharges on the dermic surface exposed by the removal of the epidermis with a pair of sharp scissors.

3d. Superficially intercrossed scarifications upon which the glanderous discharge is spread.

4th. Subcutaneous injections, with Pravaz's syringe, of virulent liquid, prepared by the trituration of glanderous matter with distilled water, with subsequent filtration through fine, clean linen.

5th. Intra-venous or intra-peritoneal injection of glanderous virus.

The interval before the appearance of the symptoms varies according to the quantity of virus used. With large quantities the eruption of the local symptoms is rapid, indeed, almost sudden, the generalization being also rapid, and death by the acute form soon taking place. With small quantities the generalization is slow, and death by a sort of chronic process takes place also slowly.

Acute glanders in the guinea pig is fatal in from fifteen to twenty-five days, while the chronic form has an average duration of sixty days, and the life of the patient may last one hundred and thirty-two days.

MM. Cadeac and Malet say, in conclusion, that to realize all the advantages that the cobaye may offer, one must:

1st. Inoculate with virus as fresh as possible in order to avoid septicemia.

2d. Inoculate two animals at the same time for the same experiment.

3d. Make the inoculation in several places on the same subject.

4th. Inoculate in the flank, in the face when one uses scissors; on the internal face of the thigh when it is done with the syringe of Pravaz.—*Revue Veterinaire.*

CORRESPONDENCE.

CORRECTION.

COLUMBIA, BOONE Co., Mo., April 25, 1887.

Editor American Veterinary Review:

DEAR SIR—In your editorial of the April number of your journal, page third, it is stated that the Massachusetts Veterinary Association is the only one, so far, that stands firm and admits only graduates to its ranks, and that if the United States Veterinary Medical Association will adopt Prof. Michener's very worthy amendment, this society shall be second in rank to follow this good policy.

I beg to state, sir, that this is an error. If you will kindly peruse the by-laws and constitution of the Missouri State Association of Veterinary Science, a copy of which I sent you long ago (and another I send now), you will see that this modest body, starting with about a dozen men, firmly refused from the outset all applications from any source excepting from graduate veterinarians from reputable veterinary institutions, and may admit graduate M. D.'s in good standing.

I learn from Dr. Lyman, of Boston, that their association was undoubtedly the first in this movement, since it started on that basis, and it is one of the oldest in the United States, I think. But I believe that the Missouri association, which was organized the 28th December, 1885, also upon the same basis (without knowing of any other veterinary body so organized), is entitled to the second place. This young, unpretentious body of a few (not over-rich) vets., has never had within its ranks a veterinary charlatan, and it has sternly refused the five dollars entrance fee of several five, ten, twenty and thirty year veterinary practitioners who had accidentally burnt (?) their diplomas, or lost (?) them in the ocean coming from the "ould country."

You will greatly oblige the Missouri Association of Veterinary Science if you will kindly insert this letter, or correct your statement in your next issue.

Your humble servant,

PAUL PAQUIN, President.

NEW JERSEY LEGISLATION.

HACKETTSTOWN, N. J., May 16, 1887.

Professor A. Liautard:

DEAR SIR—I have just been informed by Dr. Wm. Herbert Lowe, that the veterinary bill was allowed to be killed in the House. After passing the Senate, "as I supposed it had passed both houses and only wanted the Governor's signature," it was killed rather than make concessions which would legalize unqualified men.

Hoping you will make this correction and that the bill will have better success next time, I remain, yours very truly,

WILLIAM F. SHIELDS.

LIST OF VETERINARY PRACTITIONERS

REGISTERED IN WASHINGTON COUNTY, NEW YORK.

WITHOUT DIPLOMA.

David Filkins	Sandyhill
Robert G. Clark	Argyle
Albert M. McEachren	Greenwich
Edgar M. Welling	Easton
Thomas A. Brayton	Easton
Lyons M. Brayton	Easton
Thomas M. Brayton	Easton
W. H. Breason	Argyle

BY DIPLOMA.

Robert Weir, A. V .C.	Cambridge

VETERINARY LEGISLATION.

CHAPTER 166.

AN ACT TO AMEND CHAPTER 313 OF THE LAWS OF 1886, ENTITLED "AN ACT TO REGULATE THE PRACTICE OF VETERINARY MEDICINE AND SURGERY IN THE STATE OF NEW YORK."

Passed April 16, 1887; three-fifths being present.

The People of the State of New York, represented in Senate and Assembly, do enact as follows:

SECTION 1. Section three of chapter three hundred and thirteen of the laws of 1886, entitled "An Act to regulate the practice of veterinary medicine and surgery in the State of New York," is hereby amended so as to read as follows:

§ 2. Any person who has been practicing veterinary medicine

and surgery as a profession in this State for a period not less than three years preceding the passage of this act, without having obtained a diploma or certificate from a legally chartered or incorporated veterinary college, university or society, as provided for in section two of this act, must register on or before January 1st, 1888, after the passage of this act, upon making and filing with the clerk of the county in which he resides an affidavit stating that he has been so practicing veterinary medicine and surgery for the period hereinbefore prescribed.

§ 3. This act shall take effect immediately.

BILL KILLED IN THE LEGISLATURE OF 1886-'87.

AN ACT TO AMEND CHAPTER 313 OF THE LAWS OF 1886, ENTITLED "AN ACT TO REGULATE THE PRACTICE OF VETERINARY MEDICINE AND SURGERY IN THE STATE OF NEW YORK.

The People of the State of New York, represented in Senate and Assembly, do enact as follows:

SECTION 1. Section two of chapter three hundred and thirteen of the laws of 1886, entitled "An Act to regulate the practice of veterinary medicine and surgery in the State of New York," is hereby amended so as to read as follows:

§ 2. No person shall be entitled to register as such practitioner unless he be a graduate of a legally chartered or incorporated veterinary college or university, or shall hold a certificate of qualification *issued previous to the passage of this act*, from a legally incorporated veterinary society, except as provided for in section three of this act.

ASSISTANT WANTED.

Immediately, either a first or second year student of the American Veterinary College, as an assistant to a veterinarian in active practice. A reasonable compensation will be paid for such services. Address to Dr. Liautard, of the A. V. C., or to Dr. Corlies, of 28 Washington Place, Newark, N. J.

SITUATION WANTED.

A young veterinary surgeon, having had seven years' practice, wants a situation as assistant or overseer in a breeding establishment, or any other position requiring knowledge and skill in veterinary surgery. Address

H. LEMKE, P. O. Box 436, Litchfield, Conn.